CLAIMS

What is claimed is:

1. A method of controlling the flow of resin, the method comprising:

illuminating one or more resin exclusion regions on a substrate;

applying a photo-polymerizable resin to one or more dark regions of the substrate, whereon the resin flows; and,

polymerizing the resin at one or more illumination interface between the resin exclusion regions and the dark regions, thereby forming one or more barriers;

whereby the resin flows onto one or more dark regions, and is substantially restricted from flowing onto the resin exclusion regions of the substrate.

2. The method of claim **1**, wherein illuminating comprises directing laser light onto the substrate.

3. The method of claim **1**, wherein illuminating comprises directing light onto the substrate through transparent portions or around edges of a mask.

4. The method of claim **1**, wherein illuminating comprises directing light onto the substrate by reflection or refraction from a surface.

5. The method of claim **3**, wherein the light comprises UV light.

6. The method of claim **3**, wherein the mask comprises a microfluidic reagent well caddie, a semiconductor chip, a reflective/refractive surface, or cladding on an optic fiber.

7. The method of claim **1**, wherein the resin exclusion region comprises an end of a optic fiber or capillary tube.

8. The method of claim **1**, wherein the substrate comprises a microfluidic chip or a semiconductor pad.

9. The method of claim **1**, wherein the resin flow comprises capillary action.

10. The method of claim **1**, further comprising conducting electricity through the resin.

11. The method of claim **1**, further comprising final curing the resin with light or heat.

12. The method of claim **11**, wherein the substrate comprises quartz glass.

13. A resin flow control system comprising:

a mask positioned between a substrate and a light source, whereby one or more illuminated regions and one or more dark regions are defined on a surface of the substrate; and,

a photo-polymerizable resin on the substrate surface in one or more dark regions;

whereby the resin can flow on the substrate surface of the dark regions and is substantially excluded from the substrate surface of the illuminated regions.

14. The system of claim **13**, wherein the mask comprises a microfluidic reagent well caddie.

15. The system of claim **13**, wherein the mask comprises a semiconductor chip.

16. The system of claim **13**, wherein the mask comprises substantially opaque cladding on an optic fiber or capillary tube.

17. The system of claim **13**, wherein the mask comprises a reflective/refractive surface.

18. The system of claim **13**, wherein the substrate comprises a microfluidic chip.

19. The system of claim **13**, wherein the illuminated regions comprise one or more optic fiber ends or one or more capillary tube ends.

20. The system of claim **13**, wherein the substrate is positioned in a horizontal orientation and illumination is from below the substrate.

21. The system of claim **13**, wherein the light source comprises a UV lamp.

22. The system of claim **13**, wherein an intensity of the illumination is adjustable by changing a path length between the light source and the substrate, changing a diameter of a mechanical aperture in the light path, or changing a power supplied to the light source.

23. The system of claim **13**, further comprising one or more shutter between the light source and the substrate.

24. The system of claim **13**, further comprising one or more mirror reflecting light between the light source and the substrate.

25. The system of claim **24**, wherein the mirror does not substantially reflect infrared light.

26. The system of claim **13**, wherein the resin comprises one or more heat sensitive initiators.

27. The system of claim **13**, wherein the resin is in contact with both the substrate and the mask.

28. The system of claim 3, wherein at least one of the transparent portions is a perforation.